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The Linkages between Private and Public Investments in Malaysia: The Role of Foreign Direct Investment

CHEE-KEONG CHOONG^{a*}, SIONG-HOOK LAW^b AND
CHUEN-KHEE PEK^c

^a*Faculty of Business and Finance, Universiti Tunku Abdul Rahman,
Jalan Universiti, Bandar Barat, 31900 Kampar, Perak, Malaysia*

^b*Department of Economics, Faculty of Economics and Management,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor*

^c*Nottingham University Business School,
The University of Nottingham Malaysia Campus*

ABSTRACT

The objective of this study is to investigate the linkages amongst private investment, government investments, foreign direct investment (FDI) and economic growth in the case of Malaysia. The results based on the cointegration test reveal that there is a single cointegrating vector in the system, which implies that private investment, government spending, FDI, economic growth and interest rate move together to achieve their steady state long run relationship. In addition, we find that both government spending and FDI have a positive effect on private investment and these two types of investments are “crowd in” private investments in the long run as well as in the short run.

Key words: Private investment, foreign direct investment, economic growth, cointegration, causality.

* Corresponding Author: E-mail: choongck@utar.edu.my

Any remaining errors or omissions rest solely with the author(s) of this paper.

INTRODUCTION

In Malaysia, following the East Asian financial crisis and the slowdown of the private sectors' activities, there is an exigent need for the government to increase public expenditure to stimulate economic and social development in the country. The role played by the government expenditure in an economy can be important in determining economic growth. However, does high government expenditure leads to low private investment due to the government demand for funds conflicting with private investment? A growing empirical literature in fact demonstrates that the government expenditures such as wages and salaries, and the spending in expanding the government size have negative impact on private investment (Giannaros, *et al.*, 1999; Alesina, *et al.*, 2002). Indeed, Karras (1996) argues that government is unproductive when the size is relatively large because the marginal productivity of government services tends to decline. This implies that as the size of the government becomes larger, the relationship between public and private investments changes from complementary to substitutability. This change is particularly caused by the increase in government expenditure. As the role of government in stimulating the economic activities has become increasingly important, especially in the economic crisis, thus, it is an interesting to investigate the relative importance of public behaviour (fiscal policy) and private investment in promoting economic growth.

There are two different views in explaining the relationship between government and private sector investment. First, traditional view asserts that as government increases its expenditure, it will lead to a lower level of private investment because there appears a competition between public and private sectors in utilising the limited resources in the factor and financial markets¹. Second, non-traditional view argues that if the government spending can increase the marginal productivity of private investment - spending on human capital development, airport, water system and transportation and communication system - then, a significant positive relationship should be exist between these variables².

Several studies, in contrast, find empirical evidence that public spending is positively correlated with private investment (Aschauer, 1989; and Easterly and Rebelo, 1993; Cardi, 2010). If an increase in government spending leads to a raise in marginal productivity of private investment or marginal efficiency of investment,

¹ The view that an increase in public spending, resulting from higher government borrowing requirements, displaces (or reduces) private investment which, in turn, negatively affects economic growth is referred to as the "crowding out" hypothesis.

² This view believes that any increases in government spending are matched by equal increases in private investments thus having no first-order effect on private spending. Hence, this view also called as "Ricardian Equivalence" theory because the framework suggests that market agents are rational and government expenditure should be regarded as irrelevant.

then it is expected that the current level of investment will also be increased. Increasing of the private investment due to this type of government spending can be treated as subsidy provided to private sectors (Erenburg, 1993). This provides very powerful policy implications in explaining and forecasting the behaviour of private sectors in their investment decisions making. For instance, Aschauer (1989) contends that the level of government's expenditure on development has been decreasing since the past decade in the US at the levels of local, state and federal. This type of fiscal policy would lead to a lower level of private investment.

Mamatzakakis (2001) investigates the link between private and public investments and decomposes the government expenditure into two components, namely consumption and development expenditures. He finds that consumption expenditure leads to a lower level of private investment, while investment expenditure encourages the private investment. Argimon *et al.* (1997) also find the similar conclusion when they investigate the relationship between these variables in 14 OECD countries based on panel data setting. Therefore, it is important to disentangle the components of government expenditure in influencing private investments.

A number of papers have emphasized the importance of knowing on the factors that mitigate the crowding-in and out effects (Lago-Peñas, 2006; Afonso and St. Aubyn, 2009). In their study, Pradhan, *et al.* (1990) conclude that "... there is crowding out of private investment. The extent of crowding out varies with different modes of allocation and financing of public investment - it is the highest when the mode of financing is market borrowing." (pp. 114). In line with this, Blankenau and Simpson (2004) show how these effects depend on the size and tax structure of the government. They reveal that "When nondistortionary taxes are used to finance [government] expenditures, public education spending lowers both the ratio of physical capital to human capital and the level of private human capital investment." (pp. 584). On the other hand, Gaspar and Pereira (1995) argue that the problem of relative scarcity of capitals in the domestic market for both the private and public sectors may be substantially alleviated by financial integration and more efficient domestic financial markets.

In general, there is least effort of the researchers to investigate the effect of foreign direct investment (FDI) when they are examining the relationship between public spending and private investment. In fact, there is a tendency to exist a relationship between FDI and private, or domestic investment either crowd-in or crowd-out effect, as government spending. In theoretical point of view, there exists a negative relationship between private investment and FDI if multinational corporations (MNCs) are competing with the domestic firms in gathering the limited resources in the product and financial markets. In the competition of

utilising the limited resources, it is expected that MNCs will replace domestic firms as they have some strength in terms of advanced technology level, venture capital, management skills and expertise as well as MNCs are more productive than domestic firms (Borensztein, *et al.*, 1998). In contrast, FDI may crowd-in the domestic investment by complementarity in production or by improving their productivity through technology spillover effects (Ramirez, 2000; Zhu, 2010). For example, Borensztein, *et al.*, (1998) point out that FDI is actually crowd-in domestic investment and the estimated coefficient is more than 1.0, which implies that a 1% increase in FDI inflow will stimulus more than 1% private investment. The result has very important policy implications to developing countries, as the presence of the foreign direct investment would increase the level of domestic private investment through investment effect, spillover efficiency or both (Hermes and Lensink, 2003; Huang *et al.*, 2012).

The present study, therefore, aims to model the relationship between private and public investments in a small open developing economy, Malaysia by incorporating the influence of FDI, that has been absent in previous studies. The current paper differs from the multitude of other studies done on the relationship between private and public investments. The paper attempts to study whether different types of capital inflows (that is, government investment and FDI) injected into the economy have significant influence on private investment. It is interesting to discern the impacts of public investment on private investment and to investigate the channel via which public investment may be beneficial for growth of private investment. The choice of Malaysia is based, in part, on its strategic economic to the ASEAN economies, as well as its embrace of domestic-oriented policies beginning with the liberalisation and deregulation process in the early 1990s and the endogenously-driven growth strategy in the late 1990s and early 2000.

The paper is organised as follows: Section II reviews relevant empirical evidence of previous studies in order to formulate the private investment function. Section III discusses the specification model of the techniques used in this study. Empirical results are discussed in Section IV and the last section contains the conclusion and policy implications.

MODELING OF PRIVATE CAPITAL FUNCTION IN MALAYSIA: THEORETICAL MODEL

From the pervious literature, we have formed the model consists of four explanatory variables in influencing private investment (PINV), namely real gross domestic product (RGDP), real foreign direct investment (FDI), public investment (GINV) and base lending rate (BLR). These variables are selected based on the marginal

efficiency theory of investment, the accelerator theory of investment and the causal relationship between private investment and its key determinants such as public investment and FDI. The relationships of these variables are hypothesized as follows:

$$PINV = f(RGDP^+, FDI^{+/-}, GINV^{+/-}, BLR^-) \quad (1)$$

There is a controversy in debating the relationship between public spending and private investment. Some researchers conclude that there exists a positive effect between these two variables, while some argue that an inverse relationship appears between these two different investments in the economy. It is agreed that some components of government expenditure - highway, airport, port management, information and technology communication (ICT) and education - may be complementary to private investment and further contribute a positive impact on the economic growth (Ahmed and Miller, 2000). This is called as “crowd-in” effect. Nonetheless, it is generally realised that not all development expenditure can encourage the private capital stock. This is because government spending involves limited economic resources either physical or financial, this will increase the competitiveness between public and private sectors in using these resources. Finally, private investment may be reduced due to this competition in terms of reduction in limited economic resources or higher opportunity costs (Namzi and Ramirez, 1997). Therefore, an increase in government expenditure may reduce the level of private investment and this circumstance is called “crowd-out” effect.

The inclusion of real gross domestic product (RGDP) is based on the accelerator model. The model states that there exists a positive relationship between economic growth and investment. With the assumption of fixed capital stock has achieved its desired level, there is no incentive for further net investment unless the level of output (or interest rate) changes. It is the growth of output that leads continuing net investment (Branson, 1989). In addition to the indicator of economic growth, GDP indirectly represents the domestic market size for the private sectors in promoting their commodities (Ang, 2008). The variable, therefore, is a potentially significant variable in affecting private investment. However, as the marginal efficiency of investment suggests that the relationship between these two variables is changing that is, it depends on the levels of interest rate. So, it is crucial to consider the effects of interest rate in our model.

The inclusion of the base lending rate is mainly based on the marginal efficiency theory of investment (as a proxy of interest rate). The theory suggests that there appears a negative relationship between investment and the rate of interest that is, the higher the interest rate (or cost of borrowing), the lower the investment level

due to a high opportunity cost. This implies that an increase in interest rate will cause to a lower equilibrium level of investment³. The base lending rate rather than the money market rate was selected because the former refers to the cost charged by the central bank on loans made by commercial banks (that is, central bank acts as a last lender of borrowing). In addition, the base lending rate can be treated as one of the effective tools used by central bank in adjusting the economic activities (for example, consumption and investment) and market liquidity (money supply). An increase in the base lending rate will raise the level of money market rate and leads to a high level of capital cost. As a result, the level of investment in the market will be lower than the initial equilibrium level.

In general, foreign direct investment (FDI) has a strong role in stimulating the private investment through the capital and technological accumulation in the economic growth. However, there remains considerable controversy over the role of FDI inflows in increasing the capital formation and the benefits of the process that can be enjoyed by private sectors. The essential question is whether FDI inflows can promote higher level of efficiency in the private sector and encourage the higher level of private investment itself generating higher economic growth. One possible explanation for the significant role of FDI to stimulate private investment is that FDI tends to embody newer technologies and capital. This, in turn will create the technology transfer and spillover efficiency as well as provide expertise in management and further promote private investment and the economic growth. Nevertheless, the ability of private investment in absorbing these efficiencies are depend on the domestic advanced technology levels, infrastructure, managerial skills, corruption, trade, human capital development and financial sector development (Borensztein, *et al.*, 1998; Zhang, 2001; Hermes and Lensink, 2003; Alfaro *et al.*, 2004; Khamfula, 2007; Gopang and Shaikh, 2010). In contrast, FDI also might lead to a lower level of private investment if there appear great competition between MNCs and domestic firms in employing the factors of production. If MNCs are relatively strong, then MNCs will replace the domestic firms and then decrease the level of domestic investments.

³ In the standard type of investment literature, investment involves adjustment costs. Even though these adjustment costs are less significant for the discussion of steady-state effects, they become critical in the analysis of the dynamics of the current account because they make the investment function forward-looking (Borensztein, 1989: pp. 56)

SPECIFICATION OF THE MODEL

In this paper, Johansen and Juselius [hereafter JJ] (1990) cointegration technique is used to identify the number of cointegrating vector for the system. The JJ cointegration technique treats all variables as potentially endogenous and this avoids the problem of endogeneity-exogeneity in the estimation. In addition, it is capable of determining the number of cointegrating vectors for any non-stationary series with the same order of integration.

Defining Z_t as the vector of the potentially endogenous variables, then we can model Z_t as an unrestricted vector autoregression (VAR) model with lag-length up to 3:

$$Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + A_3 Z_{t-3} + U_t \quad \text{where} \quad U_t \sim IN(0, \sigma) \quad (2)$$

where Z_t is (5×1) vector consists of $PINV$, $GINV$, FDI , $RGDP$ and BLR . Each of the A_i is (5×5) matrix of parameters. Once the variables in the estimated system are found to be cointegrated, then the next step is to use the vector error-correction model to estimate the short-run dynamic causality relationship. Equation (1) can now be constructed into a vector error-correction model (VECM) in order to capture both short- and long-run impact of the vector.

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + \Pi Z_{t-3} + U_t \quad (3)$$

where $\Delta Z_t = [\Delta PINV, \Delta GINV, \Delta FDI, \Delta RGDP \text{ and } \Delta BLR]'$, $\Gamma_1 = -(I - A_1)$, $\Gamma_2 = -(I - A_1 - A_2)$ and $\Pi = -(I - A_1 - A_2 - A_3)$. Γ_i measures the short-run effect of the changes in the Z_t . The (5×5) matrix of $\Pi (= \alpha\beta')$ contains both speed of adjustment to disequilibrium (α) and the long-run information (β) such that the term $\beta' Z_{t-3}$ embedded in Equation (2) represents the $(n-1)$ cointegrating vector in the multivariate model.

There are two steps involve in the estimation of error-correction model (ECM). First, we identify the unique long-run relationship among the variables under study. Second, estimate the short-run model within the VECM to find out the short run causal relationship. The short run model is interested because we can study the behaviour of each variable in the estimated system responds or corrects itself to the residual from the cointegrating equation (error-correction term - ECT). The ECT measures the speed of adjustment of each variable in responds to a deviation from the steady state equilibrium relationship. A variable with a zero speed of adjustment implies Granger non-causal in examining the short-run dynamic impact of other variables.

Data

This paper investigates the relationship amongst private investment, public investment, FDI and Malaysian economic growth over the period 1970-2011. There are five variables involved in the estimation, namely: private investment (*PINV*), gross domestic product (*RGDP*), foreign direct investment (*FDI*), public investment (*GINV*) and base lending rate (*BLR*). These variables are collected the various issues of *Economic Report* by Ministry of Finance Malaysia and *Monthly Statistical Bulletin*, published by Bank Negara Malaysia (central bank of Malaysia). All variables (except for *BLR*) are deflated into 2000 constant price by using consumer price index (CPI). All variables are expressed in logarithmic form.

EMPIRICAL RESULTS

It is well known that most of the macroeconomic series contain a unit root in their data generating process. The regression involves non-stationary variables in the estimation will lead to spurious results, either utilising OLS or GLS technique. This means that the conventional test statistics such as *t*- and *F*-statistic are no longer valid in making an inference because spurious regression will produce high *R*-squared and *t*-statistic. As a consequence, we tend to reject the null hypothesis and increase the possibility of Type I Error (Granger and Newbold, 1974). It is important, therefore, to examine the stationarity of the series, either *I*(0), *I*(1), or higher order of integrated.

The results of ADF, KPSS and Ng-Perron unit root tests are reported in Table 1. These tests demonstrate that all series are non-stationary at their level that is, the series contains a unit root. As a result, higher order of differencing is recommended. All variables are stationary after first-differencing, or the variables are *I*(1) variables. Therefore, we conclude that all variables are stationary at their first difference, or they are *I*(1) variables.

JJ Multivariate Cointegration Test

After determining the stationarity of the series, we proceed to examine the existence of a long-run relationship among these variables by using Johansen and Juselius (1990) cointegration test. The cointegration results are reported in Table 2⁴. Using Trace test, the test statistic is able to reject the null hypothesis of $r = 1$ against its

⁴ Dummy variables were experimented with to be included in the model, namely one for the East Asian financial crisis erupted in mid-1997 and another one for the Global crisis erupted in 2007. The dummy variables, however, had little effect on private investment, as determined by the model. For this reason, none were included in the developed model.

Table 1 Results of the unit root tests

Variable	ADF		Ng and Perron		KPSS	
	Level	First difference	Level	First difference	Level	First difference
	Constant with trend	Constant no trend	Constant with trend	Constant no trend	Constant with trend	Constant no trend
PINV	-2.234	-4.732**	-9.241	-18.049**	0.147**	0.158
GINV	-1.682	-4.921**	-6.620	-18.951**	0.161**	0.357
FDI	-2.915	-9.818**	-16.570	-16.289**	0.141**	0.068
RGDP	-2.915	-7.737**	-12.312	-19.643**	0.171**	0.051
BLR	-2.154	-5.562**	-7.140	-43.765**	0.190**	0.208

Note: The null hypothesis is that the series is non-stationary, or contains a unit root. The rejection of null hypothesis for both ADF and PP tests are based on the MacKinnon critical values. The lag value is fixed at lag 1.

** indicates the rejection of the null hypothesis of non-stationary at 5% significance level.

alternative $r = 1$ at 0.10 marginal level. However, the test fails to reject the null hypothesis of $r = 1$ because the test statistic (34.134) is less than the critical value (47.856) at 0.05 marginal level. Hence, using trace test statistic, there appears a single cointegration vector in the model.

When we are looking on the maximum eigenvalue test, we can reject the null hypothesis of $r = 1$ against its alternative $r \leq 1$ at 0.05 marginal level. The test, however, do not reject the null hypothesis of $r = 1$ at 0.05 marginal level because the computed value (20.522) is obviously smaller than the critical value (27.584). Hence, both the trace and maximum eigenvalue statistics provide a consistent conclusion, that is, there exists a single cointegration vector in the estimated system.

Table 2 Results of Johansen and Juselius multivariate procedure (VAR with 1 lag)

Variables: PINV GINV FDI RGDP BLR

Sample Period: 1970-2011 (42 observations)

Hypothesis H_0 : rank=r	Maximum Eigenvalue		Trace	
	Test Statistic	95%	Test Statistic	95%
$r = 0$	35.053**	33.877	69.187*	69.819
$r = 1$	20.522	27.584	34.134	47.856
$r = 2$	7.903	21.132	13.612	29.797
$r = 3$	5.534	14.265	5.709	15.495
$r = 4$	0.175	3.841	0.175	3.841

Notes: * and ** indicate significant at 10% and 5% levels, respectively.

The estimated coefficients of the long run relationship between private investment (*PINV*), public investment (*GINV*), foreign direct investment (*FDI*), real GDP (RGDP) and base lending rate (*BLR*) are shown as follows:

$$\begin{aligned}
 PINV = & 3.342 + 0.029GINV^* + 0.916FDI^{***} + 0.806RGDP^{***} - 2.181BLR^{***} \\
 t = & \quad (2.003) \quad (3.517) \quad (3.786) \quad (8.708) \\
 & -0.136D1997^{**} - 0.08D2007 \\
 & (2.61) \quad (1.087)
 \end{aligned}$$

As shown in the equation, government development expenditure is positively correlated to private investment, which implies that an increase in government development expenditure will crowd-in the level of private investment. In other words, the development expenditure of government may enhance the productivity of private investment and, therefore, encourage the private firms to increase their investment (Aschsauer, 1989; Easterly and Rebelo, 1993). There is considerable evidence to support a positive link between government expenditures and private investments in promoting growth. See, for example, Aschauer (1989), Zhang (1996), and Reinikka and Svensson (2002).

Looking at the coefficient of FDI (0.916), high level of FDI inflow will stimulate more private investment. It is believed that the positive effect of FDI on private investment is resulted from the technological changes and efficiency spillovers in the economy of the host country (Zhang, 2001). In addition, the coefficient of FDI is quite similar to the value reported by Borensztein, *et al.* (1998), that is, one unit increases in FDI will lead to one unit increase in private capital.

We find a positive and significant relationship between RGDP and private investment. We have strong evidence to propose that economic growth have robust positive relationship on private investment. The relationship may be channeled as follows: The high level of economic growth will attract more private investment, which may lead to efficiency allocation in the economy via domestic financial evolution (Levine, 1997). Obviously, good economic performance exhibits a significant signal in encouraging the private investment in Malaysia in the long-run. Hence, it is not surprising that both the variables are positively correlated.

As suggested by *a priori*, there exists a negative relationship between private investment and cost of borrowing (base lending rate). This suggests that a high level of borrowing cost will discourage private investment activity in the economy. Our finding has confirmed the this hypothesis, as the estimated coefficient is -2.181. It is interesting to note that the adjustment of monetary policy tool (BLR) may be more powerful in controlling the level of private investment in the long run as

the estimated coefficient of BLR (-2.181) is higher than the coefficient of public investment (+0.029).

Short-Run Causality Model (Vector Error Correction Model – VECM)

Table 3 shows the Granger causality results based on VECM. Similar to the results reported by the cointegration test, all variables are significant in influencing private investment at 1% significance level. In addition, we find strong evidence that both government investment and FDI not only crucial in affecting economic growth in the long run, but also in the short run. Both variables are Granger-cause economic growth at 0.05 marginal level. As expected, base lending rate is exogenous variable in the short-run model because the variable is significant to influence other variable (that is, FDI), but not significantly influenced by others. This is because the variable is under control of Bank Negara Malaysia (Malaysia's Central Bank).

Table 3 Granger causality results based on vector error correction model

	$\Delta PINV$	$\Delta GINV$	ΔFDI	$\Delta RGDP$	ΔBLR	ECT (t-statistics)
	F-statistics					
$\Delta PINV$	-	4.752**	11.447***	5.012***	10.684***	-0.389*** (-3.402)
$\Delta GINV$	1.591	-	10.812***	3.014*	1.179	-0.046 (-0.391)
ΔFDI	11.063***	4.499**	-	7.108***	7.870***	-0.501 (-1.341)
$\Delta RGDP$	3.102*	4.933**	8.745***	-	5.153***	-0.048 (-0.856)
ΔBLR	1.193	1.114	0.751	0.358	-	-0.047 (-0.215)

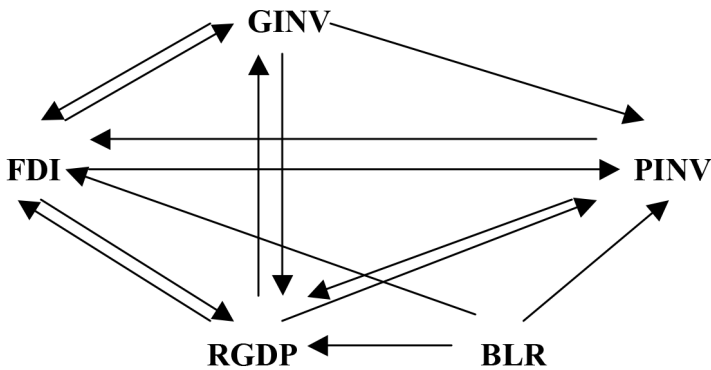
Notes: The F-statistics tests the joint significance of the lagged values of the independent variables, and t-statistics tests the significance of the error correction term (ECT). The asterisks indicate the following levels of significance: *10%, **5% and ***1%.

To sum up, we concluded that there is unidirectional causality running from: (1) GINV and BLR to PINV; and (2) BLR to both FDI and RGDP. Besides, there appears bi-directional causality effect between FDI and GINV, FDI and RGDP, GINV and RGDP, and RGDP and PINV. These linkages are summarized in Figure 1.

The results of short-run model reveal that there are two channels for government or policy-maker to promote private investment in the short-run. First, through the direct channel, the government can increase its spending on development expenditure, which will increase private investment in the short-run. Second, via the indirect channel, government may either increase its development investment to promote FDI and/or economic growth. A higher level of government investment and FDI will attract more private investment into the economy. These effects - through direct and indirect channels - will lead to a higher level of private investment in the short-run.

CONCLUSION AND POLICY IMPLICATIONS

In this study, the links between private investment and government expenditure, as well as foreign direct investment are investigated. Three procedures and frameworks were applied to achieve the objectives of the study. Firstly, multivariate cointegration framework was applied in examining the number of cointegrating vectors. Secondly, vector error-correction modeling (VECM) was regressed in discerning the dynamic short run causality direction. The unrestricted cointegration results reveal that there exists a single cointegrating vector in the model. This means that there appears a long run relationships between private investment, economic growth, foreign direct investment (FDI), government development expenditure and interest rate. It is concluded that private investment is positively correlated to both FDI inflows and government spending and negatively related to interest rate (cost of borrowing).



Notes: $X \rightarrow Y$ indicates that changes in X Granger-cause change in Y, or changes in Y lag or are influenced by changes in X. $X \leftarrow Y$ implies the reverse.

Figure 1 Short-run lead-lag linkages summarized from VECM

The results of the VECM model suggest crucial information about the short run causality relationship of the concerned variables. First, all explanatory variables are significant to Granger cause private investment in the short run. Second, there appears bidirectional causality between FDI and private investment, and economic growth and private investment. This implies that government may influence private investment through direct and indirect channels in the short-run.

The findings provide very crucial policy implications. Firstly, the policy makers should increase the level of domestic gross fixed capital formation in order to provide more financial support to domestic investors in the short run. Secondly, the expenditure of government (development) is crucial in attracting FDI inflows and the impacts of these investments will promote economic growth, as the relationship between private investment and FDI in the long run is one-to-one, or unity. Therefore, government should implement certain persistent and sustainable policies that favourable to foreign direct investments. Finally, although there appears deviation between private investment and its key determinants in the short run, the disequilibrium is not sustainable in the long run. This implies that the government is effective in stabilising its macroeconomic policies in promoting economic prosperity.

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